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The only possible alternative to strict following of rules is that zoologists should agree to accept as final the decision of some authority by them appointed. The vehicle for such authority already exists in the Nomenclature Committee of the International Zoological Congress, the only body that has any claim to represent either all branches of zoology or all nationalities.

If I may indicate a convenient form of procedure, I would suggest that those zoologists who wish to protect certain names should lay the complete facts of the case before the committee, and should accompany their request for the retention of certain definite names in defiance of the rules by the signatures of as many workers on the group affected as they can obtain. Due announcement of the proposed step should be made in certain widely circulated journals and a reasonable time should be allowed for the reception of protests. The committee should ultimately give its decision, and this decision should be published in the aforesaid journals. A summary of the labors of the committee in this direction would of course be given from time to time in the publications of the International Zoological Congress.

The precise style or mode of appointment of the desired authority does not greatly matter, if only zoologists will agree to accept it. But that it should consist of experts will doubtless be conceded. The ruling may be arbitrary, but it must none the less be made with knowledge of all the circumstances of the case and of the results that will follow from it. It must be clearly understood that the decision is to be made, not because it is in accordance with the rules, but because it is to produce practical convenience.

The next steps appear to be, on the one hand, to find out whether a sufficient number of leading zoologists are in favor of these proposals; on the other hand, to induce the International Committee to undertake this added responsibility.

F. A. BATHER

SCIENTIFIC BOOKS

Die binokularen Instrumente, Nach Quellen bearbeitet. Von MORITZ VON ROHR. Berlin, Verlag von Julius Springer. Pp. 223, 1908.

This book has been written by one of a small group of men who have grown into prominence by their original work in connection with the optical establishment of Carl

Zeiss at Jena, where for many years the scientific head was Professor E. Abbe. This firm has been known the world over for its high standards; and in photographic and microscopical optics, regarded from both the practical and the purely scientific standpoint, Abbe up to the time of his death was without a peer. His successors, Czapski, Pulfrich and von Rohr have adopted the ideals of their master; and in addition to the details involved in directing the scientific work of a large business they have found time to write books that are accepted as important contributions to optical science.

The first part, or theoretic section, of the present volume includes a general introduction, a chapter on monocular vision, and one on binocular vision, in which account is taken of certain limitations that must be heeded, due to the fact that the eye is not a simple instrument but an optical system which differs in some important respects from artificial instruments. This is true, whether the vision is direct or indirect, with one eye or with a pair of eyes used in conjunction with each other.

The greater part of the book is taken up with the historic development of the subject. The earliest binocular instrument dates back to the beginning of the seventeenth century when Lipperhey, in Holland, constructed the first telescope, and gave to Galileo the starting point for his epoch-making discoveries in astronomy. Lipperhey soon constructed a double telescope consisting of a pair of parallel tubes, each with convex and concave lens, so that by simultaneous use of both eyes double as much light could be received from the same distant object. There was no conception that the images received were in any way different, but the binocular instrument which we call an opera glass, was made prior to 1625, even though not much used. Before the end of that century improvements had been introduced for adaptation to varying interocular distance, and for focusing to suit the varying distances of objects.

Aside from the use of the telescope the superiority of a pair of eyes over a single eye

ton himself.¹ It had been discovered in the Benton beds of Kansas and is stated to consist of some fragmentary ribs and a part of a humerus. The species is supposed to be related to *Protostega*, but here again no name was imposed on the specimen. Dr. Williston pays me the compliment of regretting that I did not describe these materials, with which he could do little himself.

OLIVER P. HAY

WASHINGTON, D. C.,
January 7, 1909

QUOTATIONS

AMMUNITION AGAINST THE ANTI-VIVISECTIONIST

As antagonism to vivisection is a form of incurable insanity, those who suffer from it are wholly indifferent to argument or facts, and their delusional convictions urge them irresistibly to constant repetition of the same mad acts, quite regardless of consequences to themselves or others. Hence is it that year after year these unfortunate people renew their efforts to secure legislative interference with or prohibition of the experiments with living animals upon which the progress of medical science depends and without which medical practise would be reduced to blind, or at least dim-eyed, empiricism.

That the anti-vivisectionists always find somebody to introduce their bills is a sad commentary on the intelligence of legislators, but this year, as so often before, the battle with well-intentioned ignorance must be fought again. There are now a few more triumphs over disease with which to confront the wild assertions and accusations of the agitators, but dependence must still be placed on arguments the adequacy of which has already been proved a hundred times—so often, indeed, that many of the same people whom they long since convinced have half forgotten essential parts of the evidence upon which the animal experimenters rely as a defense from the hampering restrictions that unreasoning sentimentalists would impose upon one of the most unselfish and successful classes of workers for the common good.

¹ *Kansas Univ. Quarterly*, I., 1902, p. 247.

There is danger in this forgetfulness, and to meet it the Committee on Experimental Medicine of the New York State Medical Society has begun the publication of a series of leaflets setting forth clearly and briefly the scientific and medical side of the vivisection controversy. One by Dr. E. L. Trudeau deals with "Animal Experimentation and Tuberculosis," another by Dr. James Ewing takes up with cancer research, and a third by Professor F. S. Lee treats of "The Sense of Pain in Man and the Lower Animals." Dr. Simon Flexner's contribution tells what vivisection has accomplished in the war against infectious diseases, and Dr. S. J. Meltzer discusses "The Function of the Thyroid Gland—an Important Chapter of Modern Medicine." A leaflet of a different kind is one giving eminent lay opinions, among those quoted in it being ex-President Eliot, of Harvard; President G. Stanley Hall, of Clark University; President E. H. Capen, of Tufts College; Bishop William Lawrence, of Massachusetts, and Dean Hodges, of the Cambridge Theological School. Dr. William H. Park takes up the great subject of "Diphtheria," the disease which would still be slaying its thousands had it not been absolutely conquered through vivisection alone.

Copies of these and other leaflets can be obtained upon application at the Academy of Medicine, 17 West Forty-third Street. They are intended especially for physicians, but they are full of ammunition which anybody can use in answer to silly talk about the cruelty or the uselessness of a method of investigation which is neither the one nor the other, but is, on the contrary, one to which animals and men alike are incalculably indebted for relief from pain.—*New York Times*.

AN IDLE CHALLENGE

THIS characteristic communication comes to us from the president of the Anti-Vivisection Society:

TO THE EDITOR OF THE EVENING SUN—*Sir*: Regarding your editorial attack in *The Evening Sun* of January 27 upon a leaflet issued by this society, I would say that I should be glad to have you attempt at our mass meeting (to be held at Car-

doscopic relief was obtainable at will from a pair of exactly similar drawings by varying the conditions of geometric perspective with regard to two eyes. So far as the experiment is concerned, priority must now be assigned to Tourtual. In Helmholtz's standard work on physiological optics Tourtual's name is several times mentioned in connection with other subjects, but, until recently, his experiments on the subject now under discussion seem to have been completely forgotten.

Wheatstone's most persistent and malignant critic was Sir David Brewster, whose lenticular stereoscope was brought out in 1849. There have been few quarrels in connection with scientific discovery more bitter than this, at least on one side. That Brewster was both wrong and unreasonable seems to have been conceded quite generally. A partial excuse was found in his advanced age, eighty-six years at the time of his death in 1868.

During the decade from 1850 to 1860 the interest in stereoscopy, both on the part of students of science and by the general public was at its height; as great perhaps as the popular enthusiasm about X-rays during the first year or two after Roentgen's discovery in 1895. The possibility of its application to the microscope was soon recognized, and the first binocular microscope was devised and described by Dr. Riddell, of New Orleans, in 1852. It was greatly improved subsequently, especially by Wenham in England, whose contributions on this subject extend from 1853 to 1878. There was a large field for activity in the application of photography to the preparation of double pictures for use with the stereoscope. This was first done by Wheatstone; and the first binocular camera was devised by Brewster in 1849. Dr. F. A. P. Barnard, for nearly a quarter of a century president of Columbia College, published in 1853 a method of taking daguerreotype pictures for the stereoscope, by suitable adjustment of mirrors in conjunction with an ordinary camera. Professor Rood, in 1861, published a method of producing stereographs by hand, and an article on the practical application of photography to the microscope. Among others in America

who were active during this period was Professor W. B. Rogers, founder of the Massachusetts Institute of Technology, who in 1855 and 1856 published several notable articles on binocular vision in what was then known as *Silliman's Journal*. Professor Edward Emerson, who has but lately passed away, was first stimulated by his colleague, Rood, and published papers on this subject in 1863 and 1864, his second paper being a vigorous blow against Brewster in the unhappy strife already mentioned. In 1861 Dr. Oliver Wendell Holmes devised what became currently known as the American stereoscope, the only form extensively used in this country since that time. He declined to patent what would certainly have been a fertile source of revenue. Such was the popular demand that according to Brewster's estimate more than a half million of his stereoscopes were made during the first six years after his invention was put on the market by Duboscq, the head of a well-known firm of French opticians. On both sides of the Atlantic the market became overstocked, and after the first dozen years both scientific and popular interest in stereoscopy steadily declined. This decline, in the opinion of von Rohr, reached its lowest point during the decade from 1880 to 1890. The public had been sated, amateur workers found little more to seek, and investigators like Dove and Helmholtz, though still faithful, were turning their attention into other directions.

Accepting these facts it was perhaps natural for von Rohr to assume that in America, the home of practical men, it was useless to look for further work in physiological optics. He has no references to work published in any American scientific journal since 1865. The present writer is indebted to him for some very appreciative words about a form of reversible stereoscope designed for special purposes in 1882, but von Rohr's knowledge of the instrument was obtained from the patent office records, and not from the American or English scientific journals. It was rather unwillingly patented with full knowledge that it had little or no commercial value. But the most important oversight has been

his failure to notice any of the writings of Joseph Le Conte who certainly was well known to a wide circle of readers in this subject. There was, of course, room for difference of opinion about the validity of results, for Dr. Le Conte's first papers were evoked by what he considered to be mistakes made by Claparède and Helmholtz. Between 1868 and 1882 he published more than a dozen papers on physiological optics in the *American Journal of Science*; and the substance of these was afterward incorporated in a volume on "Sight," which passed through several editions. His acuteness as an observer was generally conceded, and the value of his work was certainly greater than that of some whose work had been done in Germany. He was not a mechanical inventor, and no instruments are ascribed to him. This fact may possibly account for failure to recognize his theoretic work in a book on "Binokularen Instrumente," but in this book there is much interesting reading on theoretic matters.

Since 1890 von Rohr finds a renewal of interest in binocular vision to have set in. For this much credit is due to Dr. Abbe and the school of scientific workers stimulated by him. The binocular microscope had passed out of favor, but between 1880 and 1895 Abbe published a considerable number of papers on binocular microscopes and telescopes, in which he described improvements of such marked value as to compel attention. Since his death the work of development has been continued by his successors, and to-day the Optische Werkstätte at Jena constitute the center from which most of the modern binocular instruments have been issued. Among the most important of these are the Zeiss stereobinocular field glasses with Porro prisms, which are now the standards of excellence in this branch of applied optics.

The third part of von Rohr's book is a systematic arrangement of its contents and a valuable index of the literature of the subject. The care and thoroughness with which this has been prepared is worthy of much praise; indeed it is a model of its kind, and is significant of the dominant standards where optical

literature is as completely methodized as mechanical work.

W. LEC. STEVENS

WASHINGTON AND LEE UNIVERSITY,

July 12, 1909

Intracellular Enzymes—A Course of Lectures Given in the Physiological Laboratory, University of London. By H. M. VERNON, M.A., M.D., Fellow of Magdalen College, and Lecturer on Physiology at Exeter and Queen's Colleges, Oxford. London, John Murray. 1908. Pp. xi + 240. Price 7s. 6d. net.

It is only a few years since Professor Hofmeister expressed the view, in a noteworthy lecture,¹ that sooner or later appropriate, specific enzymes would be discovered to account for each of the manifold vital chemical activities of cells. The recognition of the importance of enzymes in these diverse physiological functions has made it easier to understand how a minute cell can be the seat of such a multiplicity of reactions, and how it is possible for the latter to go on side by side in the living protoplasm. Physiological chemistry has lately witnessed an unusual growth of knowledge in the domain which includes fermentative reactions, particularly those associated with the so-called intracellular or endo-enzymes. The well-known books of Green, Oppenheimer and Effront have been helpful as guides to the literature, but Dr. Vernon's volume is the more welcome because it reviews the newest contributions and presents the subject in a style that is actually readable.

It is, indeed, quite a contrast to turn from the conventional chapter on pepsin and trypsin written a dozen or more years ago, to the pages of Dr. Vernon's lectures, in which the rôle of the newly recognized enzymes in various biological processes is described. Historical perspective and not a little critique characterize the author's descriptions. One becomes acquainted with the bearing of enzymes on nucleoprotein and purine metabolism; with the present status of zymase and lactacidase enzymes; the perplexing problems of so-called

¹ Hofmeister, "Die chemische Organisation der Zelle," Braunschweig, 1901.